REMARKS

The non-final Office Action mailed March 4, 2005, has been reviewed and carefully considered. Claims 1-41 are pending in the application. Claims 1-41were rejected. Claims 14 and 27 are canceled. Claims 1, 7, 17, 23, 24, 30, 38, 39, 40, and 41 are amended.

In paragraphs 7-9 of the Office Action, claims 7, 23, 24, and 41 were objected to due to certain informalities.

Applicant respectfully traverses the objection to the claims. However, in order to advance prosecution of Applicant's Application, claims 7, 23, 24, and 41 are amended. Applicant submits that the amendments to the claims do not narrow or change the scope of Applicant's Application.

In paragraph 10 of the Office Action, the specification was objected to under 35 U.S.C. § 132.

Applicant respectfully traverses the § 132 objection. However, in order to advance prosecution of Applicant's Application, the specification has been amended. Applicant submits that the amendment to the specification do not narrow or change the scope of Applicant's Application.

In paragraph 13, on page 7 of the Office Action, claims 1-8, 10 and 12-16 were rejected under 35 U.S.C. § 103(a) over Hiramoto et al. (U.S. Patent Application Publication No. 2003/0017723)

In paragraph 14, on page 7 of the Office Action, claims 17-26, 28-37 and 39-41 are rejected under 35 U.S.C. § 103(a) over Hiramoto as applied to claims 1-8, 10 and 12-16, and further in view of Gill (U.S. Patent No. 6,097,579).

In paragraph 15, on page 8 of the Office Action, claim 38 was rejected under 35 U.S.C. § 103(a) over Hiramoto as applied to claims 1-8, 10 and 12-16, and further in view of Gallagher et al. (U.S. Patent No. 5,640,343).

In paragraph 16, on page 8 of the Office Action, claim 9 was rejected under 35 U.S.C. § 103(a) over Hiramoto as applied to claims 1-8, 10 and 12-16, and further in view of Slaughter et al. (U.S. Patent Application Publication No. 2004/0041183).

In paragraph 17, on page 8 of the Office Action, claim 11 was rejected under 35 U.S.C. § 103(a) over Hiramoto as Modified by Slaughter as applied to claim 9 above, and in further view of Makino et al. (U.S. Patent No. 6,449,133).

Applicant respectfully traverses the § 103(a) rejections. Applicant respectfully asserts that the requirements are not present and a *prima facie* rejection fails under 35 U.S.C. § 103(a) because the Office Action fails to cite a reference or references that teach, disclose or suggest all the claim limitations of Applicant's application.

The instant application focuses on a magnetic tunnel junction (MTJ) device that includes "a first magnetic layer and a second magnetic layer, at least one of the first and the second magnetic layers configured to include diffusion components selected to adjust one or more properties of the tunnel junction device; and a barrier layer disposed between the first and the second magnetic layers comprising diffusion components from the at least one magnetic layer only in a diffusion region, wherein the diffusion components adjust the one or more properties of the tunnel junction device, and wherein the diffusion region comprises a diffusion component-specific depth profile."

The instant application requires that the barrier layer have "diffusion components only in a diffusion region from the at least one magnetic layer, wherein the diffusion components adjust the one or more properties of the tunnel junction device." The diffusion components comprise a diffusion region in accordance with a component-specific depth profile.

Hiramoto, on the other hand, teaches a magnetic layer 12 and a high-resistivity layer 13. Magnetic layer 12 includes metal element M and Rcp, which may include Zr or Hf. See paragraphs 0069 and 0073. High-resistivity layer 13 may be formed by using a metal element M, which may be Rcp, and reacting the surface of the film with oxygen, nitrogen, or carbon (L_{ONC}). See paragraph 0072. In Hiramoto, forming high-resistivity layer 13 includes using Rcp as the layer 13, and thus diffusion components from the magnetic layer 12 are not only in a diffusion region in Applicant's barrier layer.

Hiramoto alternatively teaches that high-resistivity layer 13 may be formed by reacting a portion of the magnetic layer 12a with the element L_{ONC}, and has the same function as the high-resistivity layer 13. In this example of forming the high-resistivity layer 13, Hiramoto does not teach that the layer 13 includes diffusion components only in a diffusion region. Rather the

reacted magnetic layer 12a forms the high-resistivity layer. Applicant points out that the process of diffusion is distinct from a reaction. According to www.wikipedia.org, "Diffusion is the movement of matter due to the movement of the individual molecules (or atoms)," and "Chemical reactions are also known as chemical changes. This refers to the changes in the structure of molecules." Therefore, the high-resistivity layer formed from a reaction with L_{ONC} does not include a diffusion region where diffusion components are only in the diffusion region.

The diffusion region is an inherent component of Applicant's Application because diffusion components diffuse into adjacent layers according to a diffusion component's depth profile. Because diffusion components in Applicant's application originate only from the magnetic layer(s), the diffusion region in the barrier layer has a unique depth profile as compared to forming a barrier layer having diffusion components.

Therefore, Hiramoto fails to disclose, teach or suggest "diffusion components only in a diffusion region from each of the at least one magnetic layer, wherein the diffusion components adjust the one or more properties of the tunnel junction device."

Applicant submits that the § 103(a) rejection should be removed because the Office Action does not provide a reason why one would modify Hiramoto. Only broad conclusory statements have been made regarding the use of Hiramoto for forming an MTJ device without providing evidence of motivation of why one skilled in the art would have been motivated to modify Hiramoto to arrive at the presently claimed invention. Furthermore, Applicant has reviewed Hiramoto and cannot find a teaching, disclosure or suggestion for modifying the reference to achieve the claimed limitations. The MPEP indicates that evidence of the reasons one of ordinary skill in the art would have been motivated to select the references and combine them should be specifically identified and shown by some objective teaching in the prior art leading to the modification. *See* MPEP § 2106. In the present instance, the Office Action has neither indicated reasons why one skilled in the art would be motivated to modify Hiramoto, nor provided any evidence of factual teachings, suggestions or incentives from the prior art that lead to the modification. Therefore, Appellant submits that the § 103(a) rejection is improper and should be removed.

Moreover, with respect to the § 103(a) rejections, the alleged motivations for making the asserted combinations are improper for being conclusory and lacking supporting evidence.

According to MPEP § 2143.01, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." The alleged motivation for making the Hiramoto-Gill combination is "in Hiramoto that the TMR device is suitable for use as a MR sensor, and the teaching in Gill that a current source and a detector are essential elements of a TMJ sensor, and that such a sensor is appropriately attached to an actuator arm and suspended over a movable recording medium so as to form a sensor device," merely indicates the references can be combined, but the suggestion of the desirability of the combination is lacking. Therefore, the alleged motivation is improper.

Similarly, the Hiramoto-Gallagher combination motivation "in view of the teaching in Hiramoto that the TMR sensors can be utilized in forming a MRAM device, and the teaching in Gallagher that an MRAM device can be formed by an array of interconnected TMJ sensors," merely indicates the references can be combined, but the suggestion of the desirability of the combination is lacking. Therefore, the alleged motivation is improper.

The Hiramoto-Slaughter combination motivation "in view of the teaching in Hiramoto that CoFeHf alloys are suitable for use in forming the magnetic layers of a TMR device, and teaching in Slaughter that a CoFeHf alloy containing 5 atomic % HF is especially suited for forming a magnetic alloy utilized in a MTJ," merely indicates the references can be combined, but the suggestion of the desirability of the combination is lacking. Therefore, the alleged motivation is improper.

The Hiramoto-Slaughter-Makino combination is improper for the reason stated above relating to the Hiramoto-Slaughter combination.

Because the combination of Hiramoto with Gill, Gallagher, Slaughter and/or Makino fails to teach, disclose or suggest all the elements of at least the independent claims, the § 103(a) rejections are improper and should be withdrawn.

Dependent claims 2-13, 15-16, 18-26, 28-29 and 31-37 are also patentable over the cited reference, because they incorporate all of the limitations of the corresponding independent claims 1, 17 and 30. Further dependent claims 2-13, 15-16, 18-26, 28-29 and 31-37 recite additional novel elements and limitations. Applicant reserves the right to argue independently the patentability of these additional novel aspects. Therefore, Applicant respectfully submits that

dependent claims 2-13, 15-16, 18-26, 28-29 and 31-37 are patentable over the cited references, and request that the objections to the independent claims be withdrawn.

On the basis of the above amendments and remarks, it is respectfully submitted that the claims are in immediate condition for allowance. Accordingly, reconsideration of this application and its allowance are requested. Please charge/credit Deposit Account No. 50-0996 (HITG.037PA) for any deficiencies/overpayments.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Attorney for Applicant, David W. Lynch, at 651-686-6633 Ext. 116.

Respectfully submitted,

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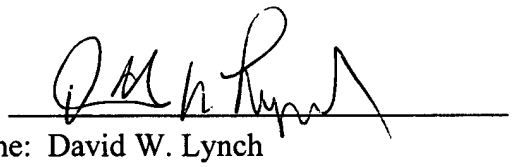
By: 
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